

Systems of Linear Equations: one solution, no solution, or infinitely many solutions

1. A system has ONE solution when the two lines are graphed and intersect at one point. The lines will have different slopes.
2. A system has NO SOLUTIONS when the two lines are parallel which means they will have the same slope but different y-intercept. When solving algebraically the solution looks similar to $0 = -3$ which is a false statement.
3. A system has INFINITELY MANY SOLUTIONS when the two lines are exactly the same on the graph. This means they have the same slope AND y-intercept. When solving algebraically the solution will be $0 = 0$ which is a true statement.

Solve using elimination

$$-3(x + 2y = 8) \rightarrow -3x + -6y = -24$$

$$3x + 6y = 24 \rightarrow 3x + 6y = 24$$

$$0 = 0$$

True Statement

Infinitely Many solutions